Appendix M
Noise and Vibration

M.1 Noise and Vibration

This appendix includes technical information on the noise and vibration modeling and measurements used in the analysis presented in *Section 3.5, Noise and Vibration*. This appendix includes figures presenting the noise impacts of the Proposed Acquisition and the No Action Alternative. The appendix includes maps showing the extent of the existing 65 A-weighted decibel (dBA) day-night average sound level (Ldn) contour in the study area, the 65 dBA (Ldn) contour under the Proposed Acquisition, and locations in which adverse noise impacts (65 dBA (Ldn) and a 3 dBA increase) would occur as a result of the Proposed Acquisition. It also includes figures showing the locations of the Bensenville, Schiller Park, Detroit Container Terminal, Wylie, Minneapolis, and International Freight Gateway intermodal facilities, as well as the locations of rail yards and noise sensitive receptors (receptors). Finally, this appendix also includes noise impact assessment results for the 205 cities and towns within the study area.

M.1.1 Sound and Vibration Measurements

OEA conducted sound level measurements of freight train operations at 10 locations, and vibration measurements at seven locations in the study area to characterize the sound and vibration emissions of CP and KCS trains. OEA conducted sound level measurements on wayside segments of track and near or at grade-crossings to determine levels with and without the train horn. OEA collected these data to supplement the broader set of data available on sound and vibration emissions of freight trains, and to evaluate actual measurements with the emissions that have been used for prior mergers (Surface Transportation Board 1997; Surface Transportation Board 2015; Surface Transportation Board 2021).

OEA conducted measurements in Davis Junction and Stillman, Illinois; Clinton, Iowa; Kansas City and Grandview, Missouri; and Shreveport, Louisiana between November 29, and December 4, 2021. OEA made observations of train speed, consist, and length for some train events; some measurements were unattended and the actual train speed, consist and lengths were not observed. OEA calculated the sound exposure level (SEL), energy average sound level (Leq), and frequency content of locomotives, railcars, and horns from the sound level measurements.

OEA used Larson Davis model LxT and model 831 sound level meters, which meet Type 1 accuracy according to the American National Standards Institute Standard S1.4, to collect sound level data. The sound level data recorded included overall A-weighted and octave-band sound levels every second. The model 831 sound level meters also collected periodic and event-based audio recordings. OEA reviewed these recordings to aid in identifying sources of sound in the environment including freight trains. OEA calibrated the sound level meters by a laboratory whose test equipment is confirmed to provide accurate results according to the National Institute of Standards and Technology and in the field prior to and after measurements using a field calibrator.

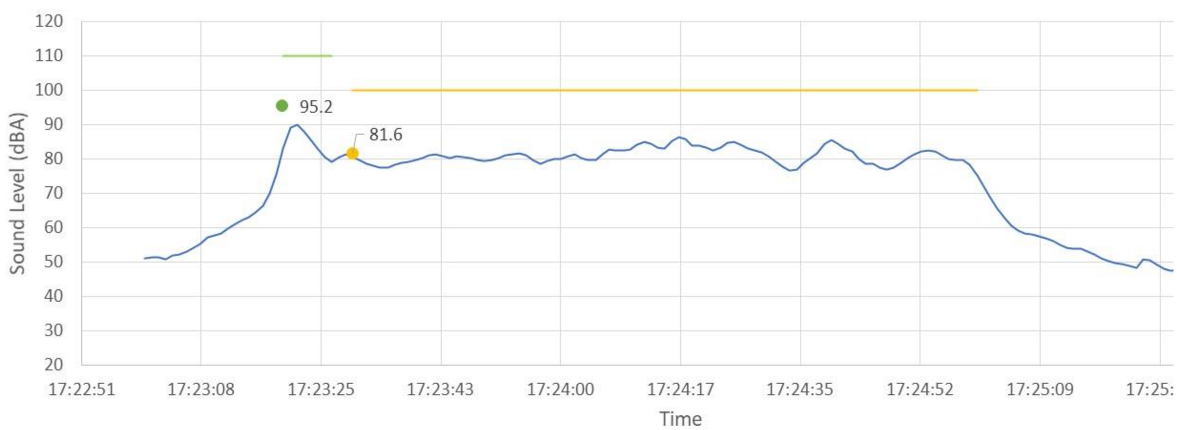
Vibration data was collected using a Rion DA-21 digital recorder, PCB model 480 E09 power supplies, and PCB Piezotronics model 393A accelerometers. OEA recorded the vibration data as acceleration levels, integrated using digital signal processing software, and analyzed as vibration velocity levels in VdB.

The atmospheric conditions were suitable for sound and vibration measurement and did not adversely influence the measurement results. The air temperature in Davis Junction ranged from 30 to 35 degrees Fahrenheit, wind speeds were generally below 10 mph, and there was no precipitation. The air temperature in Clinton ranged from 32 to 55 degrees Fahrenheit, wind speeds were generally below 10 mph, and there was no precipitation. The air temperature in Kansas City and Grandview ranged from 40 to 71 degrees Fahrenheit, wind speeds were generally 8 mph or less, and there was no precipitation. The air temperature in Shreveport ranged from 55 to 73 degrees Fahrenheit, wind speeds were generally 10 mph or less, and there was no precipitation.

M.1.1.1 Sound Measurement Results

OEA isolated sound levels from each source by reviewing the time history of train pass-by sound levels and separating out periods of time when train horns, locomotives, or railcars were the dominant source. For example, as shown in **Figure M.1-1**, the locomotives (green portion) had an SEL of 95.2 dBA, and the railcars (yellow portion) had an Leq of 81.6 dBA.

Figure M.1-1. Freight Train Pass-By Sounds Level Time History



Source: VHB 2022

As shown in **Table M.1-1**, locomotives generated sound levels from 85 to 100 dBA (SEL), with an average of 92 dBA (SEL) depending on train speed. Horns typically ranged from 106 to 116 dBA (SEL) with an average of 108 dBA (SEL) at locations between ¼-mile and 1/8-mile from grade-crossings and 111 dBA (SEL) at the grade-crossing. Railcars ranged from 63 to 83 dBA (Leq) with an average of 75 dBA (Leq) depending on train speed. For sound measurements conducted at distances other than 100 feet, OEA adjusted the levels to 100 feet based on a 4.5 dB per distance doubling.

Table M.1-1. Sound Measurement Results

Site	Location	Site Type	Speed (mph)	Sound Level at 100 feet (dBA), Range (Average)		
				Locomotives (SEL)	Horns (SEL)	Railcars (Leq)
M1	Davis Junction, IL Prairie Moon Drive	Wayside	40	88.6 - 95.4 (92.0)		66.0 - 69.9 (68.0)
M2	Stillman Valley, IL E Main Street	Wayside	40	90.7 - 96.7 (93.7)		74.9 - 78.6 (76.7)
M3	Clinton, IA Earl Mayer Park	Wayside	20	84.6 - 89.4 (87.4)		69.8 - 73.1 (71.9)
M4	Clinton, IA 4th Avenue	Wayside	20	91.9 - 91.9 (91.9)		71.9 - 75.1 (73.7)
M5	Clinton, IA 5th Avenue	Crossing	20		106.4 - 115.0 (110.9)	70.5 - 75.8 (73.1)
M6	Kansas City, MO Sni A Bar Road	Wayside	45	87.3 - 97.3 (92.3)		65.3 - 80.6 (71.0)
M7	Kansas City, MO East 91st Street	Wayside	59	85.7 - 99.9 (92.7)		68.9 - 81.5 (75.6)
M8	Grandview, MO Main Street	Crossing	59	85.8 - 88.2 (87.0)	107.7 - 116.1 (111.9)	62.6 - 77.8 (70.1)
M9	Shreveport, LA 81st Street	Both	50	92.1 - 94.7 (93.3)	100.7 - 115.9 (108.0)	71.7 - 82.2 (76.9)
M10	Shreveport, LA Pleasant Hills Drive	Wayside	50	85.4 - 96.7 (92.4)		75.8 - 83.3 (79.3)

Source: VHB 2022

Figure M.1-2 presents the measured locomotive sound level (SEL) versus speed. The measurements primarily reflect trains with two locomotives. The figure also shows the corresponding reference emission level of 98 dBA (SEL) for two locomotives at 40 mph. This figure shows that the measured levels were similar or slightly lower than the reference locomotive level.

Figure M.1-3 presents the measured railcar sound level (Leq) versus speed and the reference emission level of 79 dBA (Leq) for railcars at 40 mph. This figure shows that the measured levels were similar or slightly lower than the reference railcar level.

Figure M.1-4 presents the measured train horn sound level (SEL) versus distance from the crossing and the reference emission levels of 110 dBA (SEL) within 1/8-mile and 107 dBA (SEL) between 1/4 and 1/8-mile from the crossing. This figure shows that the measured levels were similar to the reference horn levels.

Figure M.1-5 presents the average measured sound level spectra for the locomotives, railcars, and train horns. Sound from the train horns is primarily in frequency bands 250-Hz and higher due to the fundamental tone of the horns. Sound from the locomotives and railcars have relatively similar average spectra with the highest levels in the 500 to 4,000-Hz octave-bands.

Figure M.1-2. Locomotive Sound Exposure Levels at 100 Feet

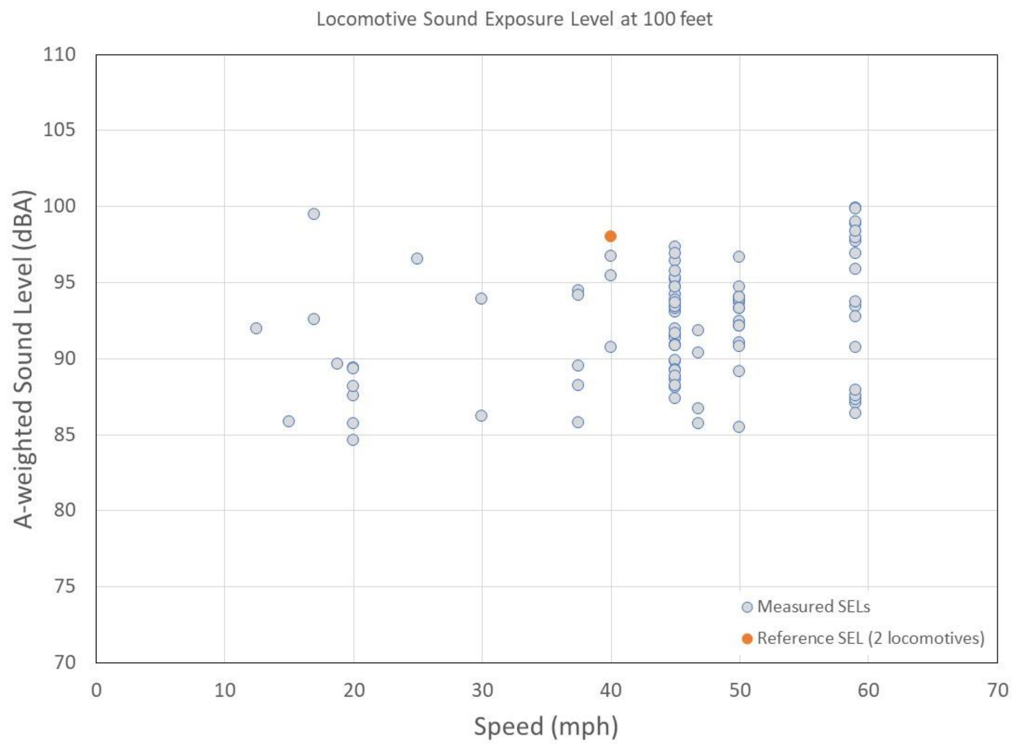


Figure M.1-3. Railcar Leq Levels at 100 feet

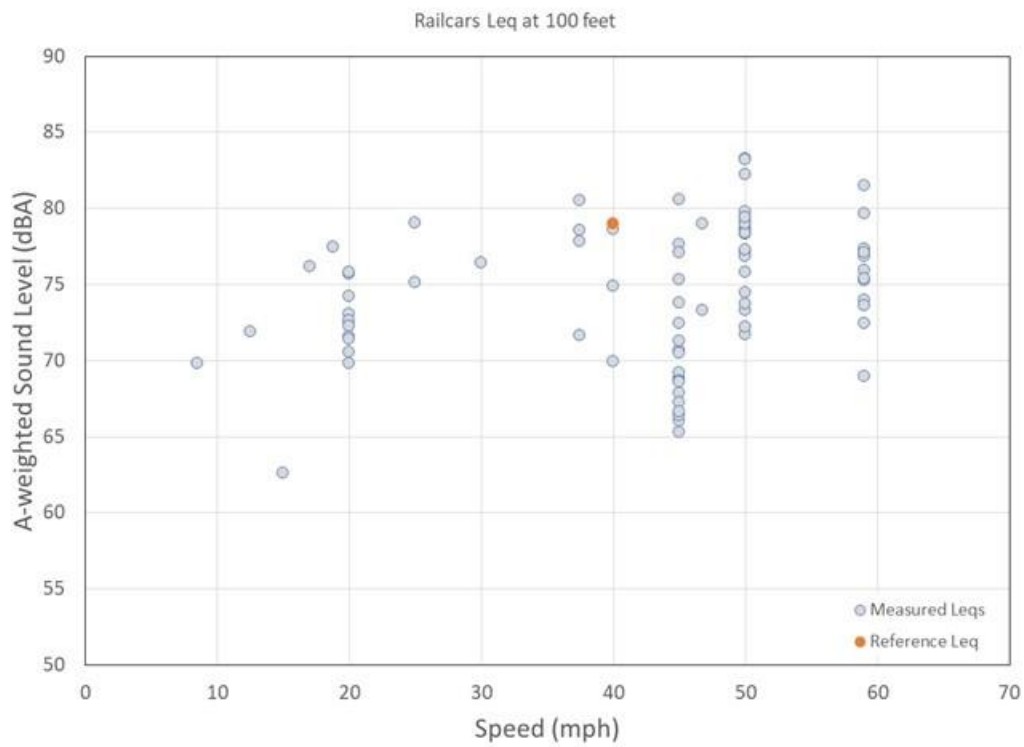


Figure M.1-4. Horn Sound Exposure Levels at 100 feet

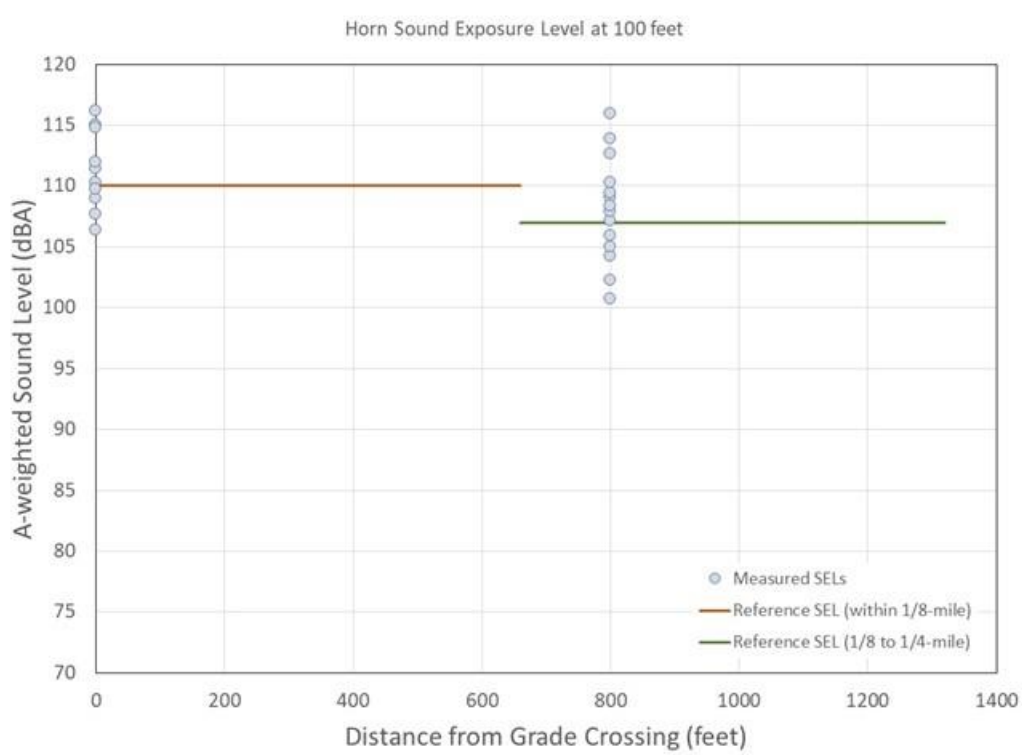
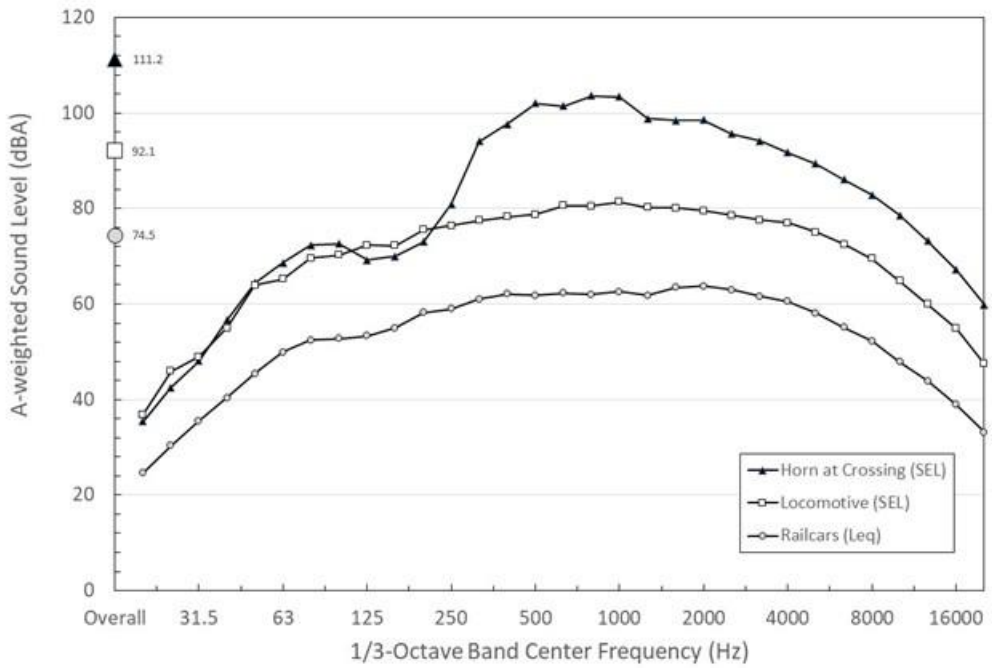


Figure M.1-5. Locomotive, Railcar, and Horn Measured Spectra



The sound level measurements of freight trains are relatively consistent with the reference emissions used for prior mergers. Since the reference levels used for prior mergers are based on a more extensive set of measurements and observations, modeling has been based on reference levels used in the Conrail (Surface Transportation Board 1997), Tongue River (Surface Transportation Board 2015), and Uinta Basin (Surface Transportation Board 2021) EISs. The reference emissions at 100 feet used include the following:

- A single locomotive at 40 mph generates sound levels of 95 dBA (SEL),
- Railcars at 40 mph generate sound levels of 82 dBA (Leq), and
- Train horns generate sound levels of 107 dBA (SEL) between 1/4 and 1/8-mile from a crossing and 110 dBA (SEL) within 1/8-mile from a crossing.

Idling locomotives are assumed to generate a sound level of 70 dBA (Leq) at 100 feet based on the EPA's Railroad Noise Emission Compliance regulation (40 C.F.R. Part 201.11(b)) for stationary locomotives built after December 1979 under idle throttle operation.

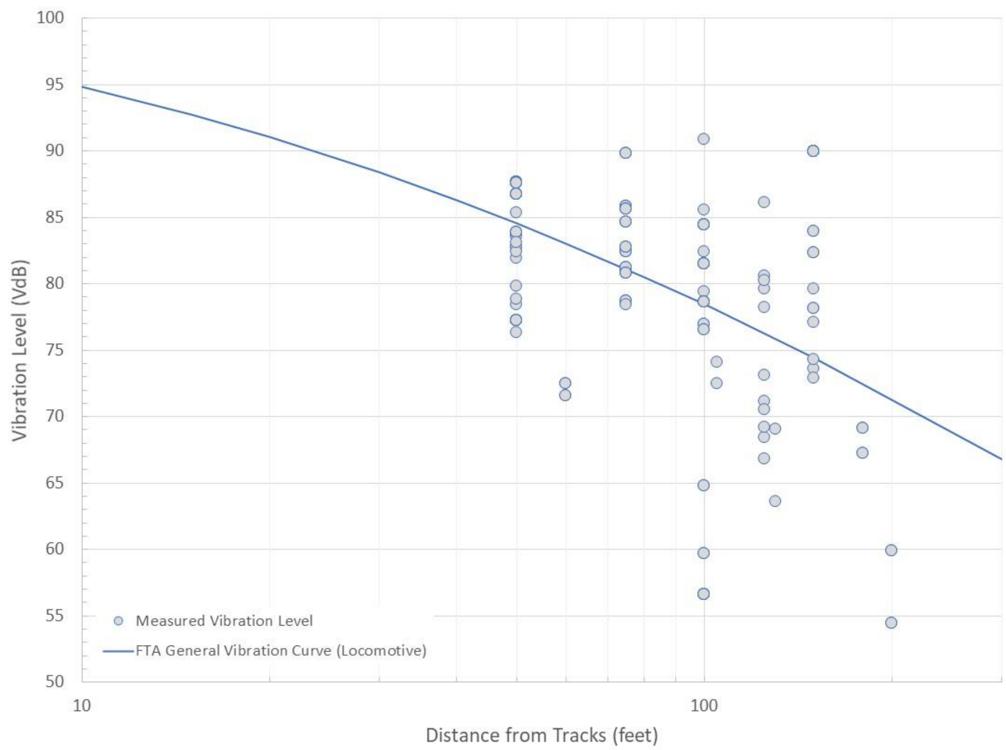
M.1.1.2 Vibration Measurement Results

OEA measured vibration levels from train pass-bys at a range of distances from 50 to 200 feet at seven measurement sites including Davis Junction, Illinois (M1), Stillman Valley, Illinois (M2), Clinton, Iowa (M3 and M4), Kansas City, Missouri (M7), and Shreveport, Louisiana (M9 and M10).

OEA separated the maximum vibration level generated by the locomotives from the vibration pass-by, similar to the method used for determining the noise level from individual sources. **Figure M.1-6** presents the maximum vibration level from the locomotives versus distance from the tracks for all measurement locations as well as the FTA general ground-borne vibration curve for freight locomotives operating at 50 mph.

This figure shows that there is a relatively broad range of vibration levels generated by the trains across the range of distances and sites. The specific reasons that vibration levels vary depend on the vibration propagation characteristics of the soil, train wheel conditions, rail conditions, and train speed. While there are similar trends with the measured vibration levels and FTA general ground vibration curves, the FTA's general curve is based on a more extensive dataset. Therefore, as discussed in the *Vibration Modeling Methodology Section* below, vibration predictions have been based on the FTA's general curve.

Figure M.1-6. Maximum Vibration Levels of Locomotives at 50 mph



M.1.2 Noise Modeling Approach

M.1.2.1 Freight Trains

Noise from the freight operations have been predicted throughout the study area using Cadna-A sound prediction software, which implements the International Standards Organization Standard (ISO) 9613-2:1996 "Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation". Cadna-A is a three-dimensional model that accounts for the sound emissions of sources in octave bands, terrain, intervening objects such as buildings, ground cover, and atmospheric conditions. Noise levels from locomotives, railcars, and horns have been modeled in octave-bands from 31.5 to 8,000 Hz.

OEA calculated noise levels (Ldn) for each segment of track at a reference distance of 100 feet using fundamental equations based on the daily train volumes, number of locomotives, train length, and speed assuming flat acoustically soft ground conditions. OEA computed noise levels for wayside track segments (without train horns), the first half of horn sounding segments (within 1/4 to 1/8-mile from the grade-crossing), and the second half of horn sounding segments (within 1/8-mile to the grade-crossing). OEA also modeled noise at proposed new track siding locations where locomotives would idle. Based on freight train emissions used in prior mergers, the sound emissions at 100 feet of a single locomotive at 40 mph is 95 dBA (SEL), railcars at 40 mph is 82 dBA (Leq), train horns are 107 dBA (SEL) between 1/4 and 1/8-mile from a crossing, train horns are 110 dBA (SEL) within 1/8-mile from a crossing, and idling locomotives are 70 dBA (Leq).

OEA used train speeds for each portion of track based on the CP U.S. East and U.S. West Timetables (March 25, 2021), the KCS System Timetable No. 15 (April 1, 2020) and the FRA grade-crossing database (January 5, 2022) for the Union Pacific (UP) Beaumont segment from Beaumont, Texas to Rosenberg, Texas and the Alliance segment from Renner, Texas to Alliance, Texas.

OEA calculated noise from freight operations at 100 feet based on the following equations as used in previous merger projects (Surface Transportation Board 2015 [Tongue River], Surface Transportation Board 2021 [Uinta]):

$$SEL_{cars} = Leq_{cars} + 10Log\left(T_{passby}\right) + 30Log(\frac{S}{S_{ref}}),$$

$$SEL_{locos} = SEL_{1\ loco\ at\ 40\ mph} + 10Log(N_{locos}) - 10Log(\frac{S}{S_{ref}}),$$

$$SEL_{trains} = 10Log(10^{\frac{SEL_{locos}}{10}} + 10^{\frac{SEL_{cars}}{10}} + 10^{\frac{SEL_{horns}}{10}}),$$

$$Ldn_{trains} = SEL_{train} + 10Log(N_d + 10N_n) - 10Log(86{,}400),$$

$$Ldn_{sidings} = Leq_{locomotive\ idling} + 10Log(T_{idle}) + 10Log(N_d + 10N_n) - 10Log(86{,}400);$$

where the SELs and Leqs correspond to each source of sound (i.e., railcars, locomotives, horns, idling locomotives at track sidings), N_{locos} is the number of locomotives per train, N_d is the number of trains during the day (7:00 a.m. to 10:00 p.m.), N_n is the number of trains during the night (10:00 p.m. to 7:00 a.m.), S is the train speed in mph, and T is the time in seconds for a train pass-by or the duration of a train idling at a siding.

Based on freight train emissions used in prior mergers, the sound emissions at 100 feet of a single locomotive at 40 mph is 95 dBA (SEL), railcars at 40 mph is 82 dBA (Leq), train horns are 107 dBA (SEL) between 1/4 and 1/8-mile from a crossing, train horns are 110 dBA (SEL) within 1/8-mile from a crossing, and idling locomotives are 70 dBA (Leq).

Cadna-A has been used to predict train noise beyond 100 feet accounting for terrain, intervening objects, ground cover, and atmospheric conditions. OEA conducted the Cadna-A calculations in a grid with 30-foot spacing at a height of five feet above ground across an area 1/2 of a mile from either side of the tracks. OEA used Digital Elevation Models with

1/3 arc-second resolution from the United States Geological Survey (USGS) in the model for terrain. OEA included buildings and structures from the Microsoft National Building Footprints dataset in the model to identify receptors. OEA categorized buildings as residences, schools, libraries, museums, places of worship, and nursing homes based on review of aerial photography, state and/or municipal zoning maps, and limited field observations.

M.1.2.2 Passenger Train Noise

OEA predicted noise levels from METRA and Amtrak passenger trains in a similar manner to freight noise, with fundamental equations being used to predict noise levels at 100 feet based on the daytime and nighttime train volumes, number of locomotives, train length, and speed assuming flat acoustically soft ground conditions. OEA then used Cadna-A to predict train noise beyond 100 feet accounting for terrain, intervening objects, ground cover, and atmospheric conditions. OEA calculated reference noise levels at 100 feet with and without train horn noise using the FTA's Noise Impact Assessment Spreadsheet (dated October 1, 2018) based on the METRA train schedule (dated July 12, 2021), Amtrak Sunset Limited train schedule (current as of January 5, 2022), METRA train speeds based on the CP US East and US West Timetables (March 25, 2021) for passenger trains, and Amtrak train speeds based on the FRA grade-crossing database (January 5, 2022).

M.1.2.3 Rail Yards and Intermodal Facilities

Noise from the intermodal facilities includes cranes for lifts and trucking operations. Noise from the rail yards includes switching engine movements that process rail cars from the departure yard to the receiving yard, and car impacts from building trains. Impact noise from coupling of railcars during the building of trains is assumed to occur once per block of railcars processed. The rail yards do not include wheel retarders which generate noise when braking railcars.

OEA modeled noise from rail yards and intermodal facilities based on methods used in previous studies (Surface Transportation Board 1997, EPA 1979, FRA 1982). The noise modeling accounts for the volume of lifts, trucking operations, rail cars processed, and the hours of operations of the rail yards and intermodal facilities. OEA calculated noise from rail yards and intermodal facilities based on the following equations:

$$Ldn_{cranes} = SEL_{cranes} + 10Log(N_d + 10N_n) - 49.4 - 10Log\left(\frac{D}{100}\right)^2 - k(D-100),$$

$$Ldn_{trucks} = 28.2 - 15Log\left(\frac{D}{450}\right) + 10Log\left(\frac{N_{total}(H_d+10H_n)}{(H_d+10H_n)}\right),$$

$$SEL_{trains} = 10Log\left(10^{\frac{SEL_{locos}}{10}} + 10^{\frac{SEL_{cars}}{10}} + 10^{\frac{SEL_{horns}}{10}}\right),$$

$$Ldn_{intermodal\ facility} = 10Log\left(10^{\frac{Ldn_{cranes}}{10}} + 10^{\frac{Ldn_{trucks}}{10}}\right),$$

$$Ldn_{car\ impacts} = SEL_{car\ impact} + 10Log(N_d + 10N_n) - 49.4 - 10Log\left(\frac{D}{100}\right)^2 - k(D-100),$$

$$Ldn_{engines} = SEL_{engines} + 10Log(N_d + 10N_n) - 49.4 - 10Log\left(\frac{D}{100}\right)^1 - k(D-100),$$

$$Ldn_{rail\ yard} = 10Log\left(10^{\frac{Ldn_{car\ impacts}}{10}} + 10^{\frac{Ldn_{engines}}{10}}\right).$$

Where D is the distance from the receptor to the center of the rail yard or intermodal facility, k is the acoustical absorption (dB reduction per distance), H_d is the number of daytime hours the facility operates, and H_n is the number of nighttime hours the facility operates.

The switching engines are assumed to move 10 railcars at a time from the receiving portion of the yard to the departure portion of the yard at flat yards such as Schiller Park and 50 railcars at a time at hump yards such as the Bensenville yard. The switching engines are assumed to make two movements for each block of railcars.

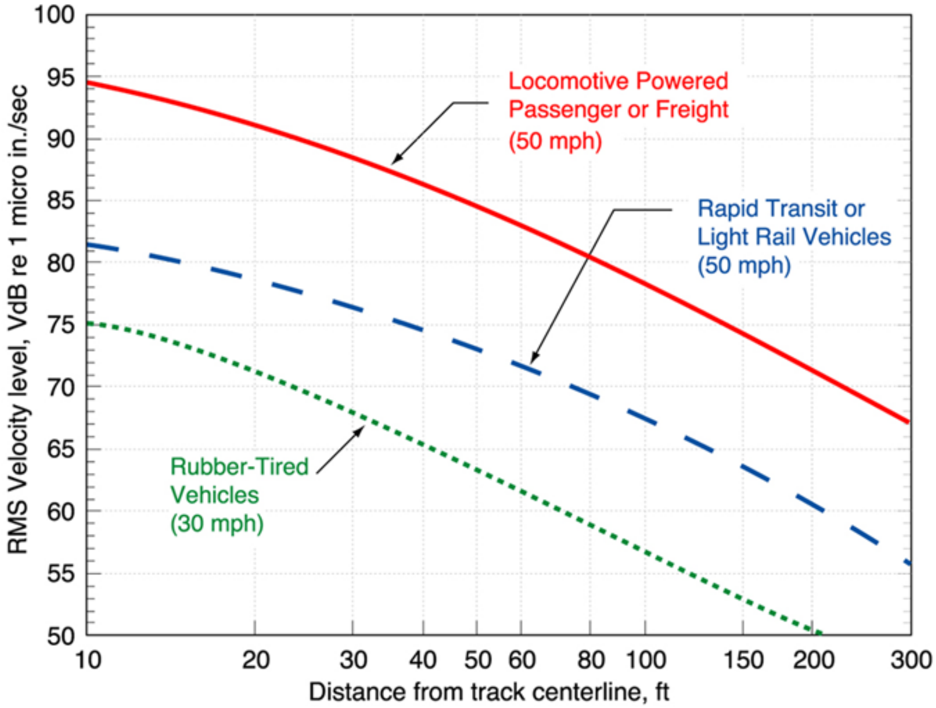
M.1.3 Vibration Modeling Methodology

Trains generate ground-borne vibration from the forces of the locomotives and railcars on the track. Vibration propagates through the track structure, through the ground, into nearby buildings, and has the potential to cause human annoyance. Locomotives typically generate higher vibration levels compared to railcars due to their greater weight. The FTA has established general ground-borne vibration curves for freight locomotives and railcars (which are characterized similarly to light rail rapid transit and light rail vehicles) that provide the outdoor vibration level based on the distance from the track.

For example, as shown in **Figure M.1-7**, the outdoor vibration level is approximately 85 VdB at a distance of 50 feet from freight locomotives traveling at 50 mph. Vibration levels are reduced as it propagates to farther distances due to the attenuation from the soil and as it propagates inside buildings depending on the type of building construction. For most wood-framed buildings, interior vibration levels are 5 VdB lower than outdoor levels. Larger buildings or heavier masonry buildings generally provide additional vibration attenuation to the interior of the building. An outdoor-to-indoor building vibration attenuation of 5 VdB has been assumed for all buildings in this analysis.

Train speed also affects vibration levels. According to FTA guidelines, a doubling in speed typically corresponds to a 6 VdB difference in vibration level. For example, a train that generates 60 VdB at 50 mph would generate 54 VdB at 25 mph.

Figure M.1-7. FTA Ground-Borne Vibration General Curves



Source: FTA, 2018

M.1.4 Noise Assessment Results by Cities and Towns

Table M.1-2 presents the number of receptors within the 65 dBA (Ldn) for the existing condition, No-Action Alternative, and Proposed Acquisition and the number of noise impacts (65 dBA (Ldn) and 3 dBA increase) within 205 cities and towns throughout the study area. Not all of the receptors are within cities and towns. Those that are not within cities and towns are in unincorporated portions of their respective counties. This table also presents a summary by state of the receptors within cities and towns. The number of receptors within cities and towns include:

- 10,125 of the 12,385 total receptors within the existing 65 dBA (Ldn),
- 19,369 of the 23,742 total receptors within the Proposed Acquisition 65 dBA (Ldn),
- 12,329 of the 15,197 total receptors within the No-Action Alternative 65 dBA (Ldn), and
- 5,158 of the 6,307 total noise impacts.

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
Bensenville, IL	19	54	28	50
Wood Dale, IL	37	73	39	0
Itasca, IL	11	53	20	42
Medinah, IL	14	50	17	0
Roselle, IL	30	44	30	20
Schaumburg, IL	0	0	0	0
Hanover Park, IL	5	22	8	22
Streamwood, IL	0	0	0	0
Bartlett, IL	26	140	36	1
South Elgin, IL	0	0	0	0
Elgin, IL	48	126	60	9
Pingree Grove, IL	9	53	25	53
Hampshire, IL	19	52	20	52
Genoa, IL	28	93	35	93
Kingston, IL	40	98	48	98
Kirkland, IL	14	64	24	64
Monroe Center, IL	47	87	50	87
Davis Junction, IL	59	97	63	82
Stillman Valley, IL	19	31	20	31
Byron, IL	24	59	29	44
Leaf River, IL	29	48	30	48
Lanark, IL	34	80	38	80
Mount Carroll, IL	0	2	0	2
Savanna, IL	11	30	16	19
Sabula, IA	1	4	1	0
Clinton, IA	133	260	142	252
Camanche, IA	180	312	194	312
Princeton, IA	116	206	128	206
Le Claire, IA	148	273	175	273
Riverdale, IA	41	55	45	55
Bettendorf, IA	24	88	39	88
Davenport, IA	7	66	10	66
Buffalo, IA	36	62	40	62
Montpelier, IA	24	52	25	52
Fairport, IA	49	74	49	74
Muscatine, IA	111	329	125	329

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
Fruitland, IA	26	91	30	91
Letts, IA	24	71	30	71
Fredonia, IA	25	51	27	51
Columbus Junction, IA	5	21	6	21
Cotter, IA	3	15	4	15
Ainsworth, IA	35	80	38	80
Washington, IA	42	206	49	206
Ottumwa, IA	42	117	50	117
Blakesburg, IA	14	67	18	67
Moravia, IA	28	72	31	72
Rathbun, IA	0	8	0	8
Mystic, IA	1	13	2	13
Seymour, IA	47	154	51	154
Powersville, MO	5	19	7	19
Lucerne, MO	2	9	2	9
Newtown, MO	1	10	1	10
Harris, MO	3	22	3	22
Osgood, MO	1	3	1	3
Laredo, MO	2	12	3	12
Chula, MO	0	10	0	10
Chillicothe, MO	33	127	42	127
Ludlow, MO	4	16	5	16
Braymer, MO	1	17	2	17
Cowgill, MO	12	29	12	29
Polo, MO	1	7	3	7
Elmira, MO	1	9	3	9
Lawson, MO	84	215	100	215
Excelsior Estates, MO	0	1	0	1
Excelsior Springs, MO	66	218	91	218
Mosby, MO	1	1	1	1
Liberty, MO	19	121	53	121
Birmingham, MO	0	28	2	28
Kansas City, MO	139	305	234	6
Grandview, MO	30	72	44	0
Belton, MO	0	0	0	0
Cleveland, MO	46	93	69	0

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
Drexel, MO	62	112	81	0
Merwin, MO	20	24	24	0
Amsterdam, MO	40	73	50	0
Amoret, MO	15	26	20	0
Hume, MO	31	50	40	0
Stotesbury, MO	0	0	0	0
Richards, MO	36	40	40	0
Mulberry, KS	3	16	6	0
Yale, KS	11	17	12	0
Frontenac, KS	17	39	31	0
Pittsburg, KS	346	652	430	0
Asbury, MO	23	36	26	0
Carl Junction, MO	75	127	87	0
Airport Drive, MO	1	4	1	0
Joplin, MO	221	382	268	0
Saginaw, MO	9	14	10	0
Neosho, MO	115	180	137	0
Goodman, MO	80	141	92	0
Anderson, MO	85	163	106	0
Lanagan, MO	31	48	35	0
Noel, MO	83	117	91	0
Sulphur Springs, AR	33	58	38	0
Gravette, AR	70	131	81	0
Decatur, AR	62	94	66	0
Gentry, AR	77	154	91	0
Siloam Springs, AR	63	163	84	0
Watts, OK	6	26	10	0
Westville, OK	86	143	97	0
Baron, OK	11	14	11	0
West Peavine, OK	3	6	3	0
Peavine, OK	9	15	9	0
Fairfield, OK	1	1	1	0
Zion, OK	2	4	2	0
Stilwell, OK	107	166	126	0
Lyons Switch, OK	2	5	2	0
Cave Spring, OK	6	9	7	0

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
Bunch, OK	15	17	15	0
Flute Springs, OK	3	3	3	0
Marble City, OK	27	46	32	0
Sallisaw, OK	160	293	191	0
Gans, OK	8	14	10	0
Spiro, OK	76	139	102	0
Panama, OK	111	195	132	0
Shady Point, OK	28	52	35	0
Poteau, OK	171	353	224	0
Howe, OK	2	7	3	0
Heavener, OK	64	154	79	0
Hodgen, OK	23	31	25	0
Acorn, AR	14	19	16	0
Mena, AR	60	165	86	0
Hatfield, AR	26	43	30	0
Cove, AR	23	46	28	0
Vandervoort, AR	19	31	21	0
Wickes, AR	32	54	37	0
Grannis, AR	28	49	32	0
Gillham, AR	27	36	30	0
De Queen, AR	15	50	25	0
Winthrop, AR	31	45	32	0
Alleene, AR	8	13	9	0
Wilton, AR	61	89	72	0
Ashdown, AR	84	187	113	0
Ogden, AR	30	48	33	0
Texarkana, TX	173	346	223	0
Bloomburg, TX	35	74	50	0
Rodessa, LA	40	65	48	0
Vivian, LA	96	210	147	0
Oil City, LA	87	127	97	0
Mooringsport, LA	46	83	56	0
Blanchard, LA	50	115	68	0
Shreveport, LA	373	665	486	0
Frierson, LA	50	54	50	0
Mansfield, LA	151	289	175	0

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
South Mansfield, LA	18	31	21	0
Converse, LA	25	46	30	0
Noble, LA	24	42	25	0
Zwolle, LA	32	57	37	0
Many, LA	18	49	24	0
Fisher, LA	39	54	45	0
Florien, LA	54	95	63	0
Hornbeck, LA	16	38	18	0
Anacoco, LA	68	117	84	0
Leesville, LA	135	217	152	0
New Llano, LA	26	38	30	0
Rosepine, LA	37	68	43	0
DeRidder, LA	95	152	106	0
Singer, LA	20	32	26	0
Oretta, LA	11	24	15	0
DeQuincy, LA	112	203	127	113
Starks, LA	31	68	42	68
Deweyville, TX	1	3	1	3
Mauriceville, TX	17	40	25	21
Vidor, TX	199	392	230	377
Rose City, TX	37	70	41	64
Beaumont, TX	6	23	12	0
Central Gardens, TX	10	14	11	0
Nederland, TX	49	84	55	0
Port Neches, TX	51	71	56	0
Port Arthur, TX	212	348	256	0
Rosenberg, TX	69	103	91	0
Beasley, TX	29	59	38	0
Kendleton, TX	88	135	100	0
Hungerford, TX	53	84	60	0
Wharton, TX	15	41	26	0
El Campo, TX	13	32	22	0
Louise, TX	25	44	36	0
Ganado, TX	36	59	42	0
Edna, TX	53	98	79	0
Inez, TX	46	79	63	0

Table M.1-2. Noise Assessment Results by Cities and Towns

City/Town	Receptors within 65 dBA (Ldn)			Receptors with Adverse Noise Impacts (65 dBA Ldn and 3 dBA increase)
	Existing	Proposed Acquisition	No-Action	
Victoria, TX	200	347	224	0
Placedo, TX	16	25	18	0
Bloomington, TX	97	150	105	0
Refugio, TX	155	227	167	0
Woodsboro, TX	15	28	17	0
Sinton, TX	143	222	149	0
Morgan Farm, TX	4	5	5	0
Odem, TX	56	86	61	0
Corpus Christi, TX	30	59	36	0
Robstown, TX	204	320	242	0
Banquete, TX	92	120	101	0
Agua Dulce, TX	49	82	63	0
Alice, TX	161	326	240	0
Rancho Alegre, TX	5	20	8	0
Loma Linda East, TX	9	20	16	0
San Diego, TX	245	342	291	0
Benavides, TX	135	206	166	0
Realitos, TX	41	51	45	0
Hebbronville, TX	125	226	160	0
Bruni, TX	1	2	2	0
Oilton, TX	4	10	8	0
Mirando City, TX	51	73	57	0
Aguilares, TX	9	10	10	0
La Coma, TX	4	8	6	0
Laredo, TX	279	390	347	0
Totals by State				
Illinois	523	1,356	636	897
Iowa	1,162	2,747	1,309	2,735
Missouri	1,378	2,881	1,786	880
Kansas	377	724	479	0
Oklahoma	921	1,693	1,119	0
Arkansas	763	1,475	924	0
Louisiana	1,654	2,939	2,015	181
Texas	3,347	5,554	4,061	465
Total	10,125	19,369	12,329	5,158

M.1.5 Noise and Vibration Figures

The following section includes figures throughout the study area presenting the existing, No-Action, and Proposed Acquisition 65 dBA (Ldn) noise contours, the noise impact contours (65 dBA (Ldn) and 3 dBA increase), and the Proposed Acquisition vibration contours. This section also includes figures of the railyards and intermodal facilities showing the closest receptor locations used in the noise impact assessment.